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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,545	05/12/2004	Garrin Samii	AMS-004	3544
26918	7590	11/09/2004	EXAMINER	
WHITE & FUDALA 57 BEDFORD STREET SUITE 103 LEXINGTON, MA 02420			DOVE, TRACY MAE	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 11/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/709,545	Applicant(s) SAMII ET AL.	
	Examiner Tracy Dove	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 10-18 and 20-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. <u>11/4/04</u> |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                                 |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/12/04</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-9, 11-17, 19 and 20, drawn to a battery separator, classified in class 429, subclass 142.
- II. Claims 10 and 18, drawn to a method of producing a battery separator, classified in class 29, subclass 623.1.
- III. Claims 21 and 22, drawn to a microporous filter, classified in class 210, subclass 650.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product may be made by another and materially different process. The separator may be coated, pressed or extruded.

Inventions I and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention of Group III has separate utility such as a filter for a water purification device. See MPEP § 806.05(d).

Inventions II and III are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be

Art Unit: 1745

used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product may be made by another and materially different process. The filter may be coated, pressed or extruded.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Groups II and/or III, restriction for examination purposes as indicated is proper.

This application contains claims directed to the following patentably distinct species of the claimed invention: Applicant must choose between [1] a microporous membrane comprising ultra high molecular weight polyolefin and  $\text{TiO}_2$  (claims 1-9 and 19) or [2] a microporous membrane comprising ultra high molecular weight polyolefin, a low molecular weight polyethylene and  $\text{TiO}_2$  (claims 11-17 and 20).

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Art Unit: 1745

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Mark White on 11/4/04 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-9, 11-17, 19 and 20. Applicant further elected species [1] a microporous membrane comprising ultra high molecular weight polyolefin and TiO<sub>2</sub> (claims 1-9 and 19). Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-18 and 20-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "said separator's surface". There is insufficient antecedent basis for this limitation in the claim. Examiner suggests "wherein said separator comprises a surface, said surface is treated with".

***Claims Analysis***

The phrase "used in a non-aqueous electrolyte battery" in claim 7 and the phrase "for use in an aqueous electrolyte battery" in claim 8 are not given patentable weight because the phrases do not further limit the battery separator of claim 1 or claim 2 (intended use limitations).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

Art Unit: 1745

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 7, 9 and 19 are rejected under 35 U.S.C. 102(b) as being unpatentable over Sogo, US 5,641,565.

Sogo teaches a separator for a battery comprising a microporous film including a matrix comprised of a polyethylene and a polypropylene polymer. The polyethylene has a molecular weight of not smaller than 1,000,000 and is in a proportion of 10% by weight. The separator has a thickness of 10-500  $\mu\text{m}$ , a porosity of 40-85% and a maximum pore diameter of 0.05-5  $\mu\text{m}$  (abstract). The membrane is produced by blending the matrix polymer with inorganic particles, such as titanium oxide, having an average particle size of from 0.005-0.5 $\mu\text{m}$  (21-25). The separator comprises 10-60 wt% of the matrix polymer and 10-50 wt% of the inorganic particles (6:63-7:10). The membrane may contain 3% by weight or less of the inorganic particles (8:36-39). The separator has a shutdown temperature of 135-140°C and a melt integrity of 165°C (9:4-11). The air permeability of the membrane is shown in Table 1.

Thus the claims are anticipated.

\*\*

Claims 1-9 and 19 are rejected under 35 U.S.C. 102(b)/103(c) as being anticipated by, and alternatively unpatentable over, Samii et al., US 6,372,379.

Samii teaches a microporous membrane battery separator for a battery comprising a filler and a polyolefin. The polyolefin has a molecular weight of at least 3,000,000 and the filler comprise titanium dioxide ( $\text{TiO}_2$ ). The battery separator has an average pore diameter in a range of 0.01-0.1 microns and a thickness between 3-10 mils (5:40-62). Note 3-10 mils is equivalent

Art Unit: 1745

to 76.2-254  $\mu\text{m}$  (see conversion printout, obtained from ProKon Unit Conversion, attached to this Action). The titanium dioxide filler has a particle diameter of 0.18 microns (6:5-9).

Example 1 teaches the membrane may have a porosity of 50% and consists of approximately 5% UHMW polyethylene and 95%  $\text{TiO}_2$ . The membrane of example 1 has an average pore diameter of 0.077 microns. A wetting agent is used to coat the membrane (6:14-15).

Thus the claims are anticipated.

Samii is silent regarding the air permeability of the membrane. However, the membrane of Samii would inherently have an air permeability in the range recited by the claimed invention. Air permeability is the time required for a measured amount of air to pass through the separator (present specification, [0056]). Since the separator of the claimed invention and the separator of Samii appear to be the same, the separator of the claimed invention and the separator of Samii would have the same air permeability property. Samii teaches the membrane of example 1 has an average pore diameter of 0.077 microns, which falls within the average pore diameter range of claim 9. The air passes through the pores of the separator, thus, separators with the same average pore diameter would inherently have the same permeability to air.

Regarding claims 3-5, Samii is silent regarding a shutdown temperature, a melt integrity or a puncture resistance of the membrane separator. However, since the separator of the claimed invention and the separator of Samii appear to be the same, the separator of the claimed invention and the separator of Samii would inherently have the same properties. One of skill would have known that identical materials melt at the same temperature, shutdown at the same temperature and have the same puncture resistance.



Art Unit: 1745

Regarding claim 6, the limitation a “shrinkage of 10% or less both in the machine and transverse directions” is considered a product-by-process limitations. The courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. MPEP 2113. Samii teaches that if the membrane is immersed in boiling water, the membrane shrinks 10-20% in the machine direction (Examples 3 & 4). Samii also teaches if the membrane is dried with hot air the membrane does not shrink at all (Example 5).

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Claims 5, 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sogo, US 5,641,565 in view of admitted prior art at paragraph [0086] of the present specification.

Sogo teaches a separator for a battery comprising a microporous film including a matrix comprised of a polyethylene and a polypropylene polymer. The polyethylene has a molecular weight of not smaller than 1,000,000 and is in a proportion of 10% by weight. The separator has a thickness of 10-500  $\mu\text{m}$ , a porosity of 40-85% and a maximum pore diameter of 0.05-5  $\mu\text{m}$  (abstract). The membrane is produced by blending the matrix polymer with inorganic particles, such as titanium oxide, having an average particle size of from 0.005-0.5 $\mu\text{m}$  (21-25). The separator comprises 10-60 wt% of the matrix polymer and 10-50 wt% of the inorganic particles (6:63-7:10). The membrane may contain 3% by weight or less of the inorganic particles (8:36-39). The separator has a shutdown temperature of 135-140°C and a melt integrity of 165°C (9:4-11). The air permeability of the membrane is shown in Table 1.

Sogo is silent regarding the puncture resistance of the membrane separator.

However, since the separator of the claimed invention and the separator of Sogo appear to be the same, the separator of the claimed invention and the separator of Sogo would inherently

Art Unit: 1745

have the same properties. One of skill would have known that identical materials have the same puncture resistance.

Sogo is silent regarding the thermal shrinkage of the membrane separator.

However, the limitation a "shrinkage of 10% or less both in the machine and transverse directions" is considered a product-by-process limitations. The courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. MPEP 2113.

Sogo is silent regarding a surface treatment of the membrane separator.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Applicant admits that the most common method of surface treatment is by using a suitable wetting agent to coat the microporous sheet separator. The specification states "The method of coating and type of wetting agents are well known in prior art and there is no need to discuss these in detail". One of skill in the art would have been motivated to treat the separator surface with a wetting agent because this is the most common surface treatment, as admitted by Applicant.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Nagou teaches a microporous film for use as a separator of a battery (1:9-12) having a thickness of 5-200  $\mu\text{m}$ , a porosity of 30-90%, an average pore size of 0.005-0.6  $\mu\text{m}$  and an air permeability of 5-500 sec/100 cc (abstract). The film comprises a microporous polypropylene (polyolefin) film containing a filler wherein the filler may be a nonsiliceous filler having an average particle size smaller than 1  $\mu\text{m}$  (3:4-25).  $\text{TiO}_2$  is specifically disclosed by Nagou as a

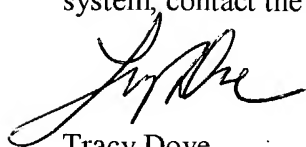
Art Unit: 1745

nonsiliceous filler material (Run No. 2; Table 3). Run 2 in Table 3 teaches a microporous film comprising 40 wt% of polypropylene (27:3-5 and Example 12) and 60 wt% of TiO<sub>2</sub>. The microporous film has a thickness of 200  $\mu$ m, a pore size of 0.5  $\mu$ m, and porosity of 70% and an air permeability of 140 sec/100 cc. Nagou teaches the film may have a thickness of 5-200  $\mu$ m, a porosity of 30-90%, an average pore size of 0.005-0.6  $\mu$ m and an air permeability of 5-500 sec/100 cc (abstract). The polypropylene has a melting point of 166°C (12:44-47). Nagou does not teach the molecular weight of the disclosed polypropylene.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tracy Dove  
Patent Examiner  
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November 4, 2004